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Identifying pregnancy-related risk perception among pregnant women attending antenatal clinic in Wolisso district of Oromiya Regional State

Candidate: Legesse Hirpa (BSc)

Advisors: 1. Seblewengel Lemma (BSc, MPH)

2. Ewenet Gebrahanna (BSc, MPH)

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List of Acronyms

ANC: Antenatal care

AOR: Adjusted odds ratio

CI: Confidence interval

DHS: Demographic Health Survey

EDHS: Ethiopia Demographic Health Survey

EOC: Emergency obstetric care

IEC/BCC: Information, education & communication/ behavioral change communication

MDG: Millennium Development Goal

MMR: Maternal mortality ratio

ORS: Oromiya Regional State

OR: Odds ratio

SPSS: Statistical Package for Social Sciences

UN: United Nations

WHO: World Health Organization

Abstract

Background: Maternal mortality remained persistently high in Ethiopia. Home delivery with unskilled birth attendant and delay in seeking care for complications are often reported to be among the main contributing factors. While ANC provides opportunity to empower pregnant women on pregnancy risk and benefits of skilled care, most ANC clients opt for home delivery.

Objective: To identify pregnancy-related risk perception among pregnant women attending antenatal clinics in Wolisso district of Oromiya Regional State, Ethiopia.

Methods: A cross-sectional facility-based study was conducted in February and March 2011.

Results: Data were obtained from 434 pregnant mothers attending antenatal clinic with a response rate of 98%. Only 18% (95%CI= 14.4%, 21.6%) of them perceived pregnancy-related risk. Knowledge of 2 or more danger signs during pregnancy, delivery and postpartum were 27%, 6% and 14.5% respectively. In multivariate analysis, risk perception was higher among mothers who had ≥4 ANC visits (OR= 3.60, 95%CI= 1.20, 10.81) and complications during current pregnancy (OR= 9.90, 95%CI= 4.40, 22.22) while knowledge of 2 or more danger signs during pregnancy was higher among urban residents (OR=4.41, 95%CI=1.73, 11.19), mothers who had complication during current pregnancy (OR= 2.90, 95%CI= 1.30, 6.50), ANC clients who received information (OR= 4.76, 95%CI= 1.74, 13.08) and mothers who had two and three antenatal care visits (OR= 3.25, 95%CI= 1.34, 7.93; OR= 3.31, 95%CI= 1.29, 8.49) respectively.

Conclusion and recommendations: The majority of pregnant women have high false sense of security against risk and lack of awareness about obstetric danger signs, which eventually result in delay in seeking care for pregnancy complications. This is likely to be true for seeking skilled attendant at birth. Therefore, IEC/BCC interventions should be strengthened, especially in rural areas. Besides, the result of the study depicted the clear benefit of optimal use of antenatal care, but it was found to be very low. Therefore, strategies to enhance optimal use of antenatal care should be identified, tested and scale up. .

1. Introduction

Every pregnancy is potentially at risk of complications; it is estimated that about 15% of pregnant women experience life threatening complications that are unpredictable and do require emergency obstetric care. The majority of these complications are largely unpreventable, and if not treated timely, they are likely to lead to death whilst the majority of them can be successfully treated in equipped emergency obstetric care facilities; skilled attendant at birth with emergency obstetric care back up could save the life of 75% of the mothers dying from pregnancy-related complications. However, many women still die from pregnancy related causes (1-4).

Women from Sub-Saharan Africa and Asia are particularly disproportionately affected by maternal mortality while maternal death is a rare event in the developed world. Maternal deaths in these regions constitute 95% of pregnancy related deaths worldwide (5-7). Having a maternal mortality ratio of 673 per 100,000 live births and infant mortality rate of 77 per 1,000 live births, Ethiopia is among the countries with the highest maternal and infant mortality in the world (8). Despite the wide spread maternal deaths in Ethiopia, skilled care seeking at birth has not changed much although access to such service has substantially increased in Ethiopia, especially during the last decade. In fact, like many developing countries, Ethiopia has severe shortage of skilled birth attendant, but still there is a wide gap between access and use. Ethiopian Demographic and Health Survey (EDHS) 2005 revealed that only 6% of the births occurred in Ethiopia during the 5 years preceding the survey were assisted by health professionals while it is even lower in Oromiya Regional State, amounting to only 3.7%. The antenatal coverage for Ethiopia and Oromiya Regional state were also only 28% and 24.8% according to EDHS 2005 report respectively (8-10).

These facts invite for the following important questions: why pregnant women are not seeking skilled attendant at birth, particularly where the service is accessible? Why do pregnant women opt for home delivery while antenatal care visit to skilled health care giver is believed to provide opportunity to provide counseling and education that can enhance knowledge of pregnancy risk,

benefits of skilled care and also health care seeking? Given that the majority of births are taking place at home away from equipped health facilities, do pregnant women, their families and communities have awareness about pregnancy complications to recognize and act timely in the event of complications? Studies consistently revealed the association of antenatal clinic attendance with better awareness about pregnancy complications and utilization of skilled attendant at birth, but missed opportunities for provision of information and education at antenatal clinic was consistently reported (9, 11-13).

In Ethiopia, studies conducted to assess pregnancy related risk perception among pregnant women in general and among ANC clients in particular is inadequate. The same holds true for pregnant women's awareness about obstetric danger signs. Above all, study conducted in the study setting to explore pregnancy-related risk perception and mothers' knowledge of obstetric knowledge is lacking to guide maternal health program planning and implementation in the study setting.

This study, therefore, aimed at identifying pregnancy-related risk perception, awareness about danger signs of pregnancy and factors associated with risk perception and knowledge danger signs in order to generate evidences crucial to planning and implementation of interventions geared to improvement of maternal health in general and interventions aimed at promotion of maternal health in particular. Accordingly, the study provided insights about pregnant women's psychology and information needs in relation to pregnancy and pregnancy complications. It has also reflected on information provision and client-provider interactions at antenatal clinics.

2. Literature Review

With the goal of reducing maternal mortality by three quarters between 1990 and 2015, improving maternal health has been adopted as one of the eight Millennium Development Goals (MDGs) endorsed at the 2000 Millennium Summit. However, maternal mortality remained to be very high in many developing countries; in 2008, an estimated 358,000 maternal deaths occurred worldwide, out of which 99% occurred in developing countries, where Sub-Saharan Africa and South Asia accounted for 87% of global maternal deaths. In addition to substantial regional disparities, MMRs vary greatly across countries. The levels of maternal mortality not only remained high in Sub-Saharan Africa but also the rate of annual decline is also slower than in any other region. According to UN Interagency maternal mortality estimates, the reduction in both the global number of maternal deaths and the maternal mortality ratio for the period between 1990 and 2008 was only one-third; the progress of the average annual percentage decline in the global MMR in developing region and in Sub-Saharan Africa, where the levels of maternal mortality are the highest, were only 2.3% and 1.7% respectively. The rate of decline is inadequate given that the achievement of MDG target requires 5.5% decline in a year; the report commented that there is a progress to celebrate, but stressed the need to accelerate the efforts to save lives (3).

Factors that contribute to maternal mortality are multiple and interconnected. High maternal mortality ratio suggests women's lack of access to quality healthcare facilities. Often many women die from pregnancy complications due to the notable three delays that underline maternal mortalities, where the first two delays have their routes largely in the community. The first delay is delay in deciding to seek care that often occurs due to lack of awareness about obstetric danger signs, low women's status and cultural influences while the second delay is delay in reaching care due to lack of money for transport and treatment, long distance, lack of means of transport, lack of roads, mountains etc. The association between these factors and maternal mortality and morbidity holds true for Ethiopia and in turn Oromiya Regional State (14-16).

Antenatal care is a key entry point for a broad range of health promotion and preventive services. It provides opportunities to empower pregnant women and their families on pregnancy-related risks and risk reduction measures to ensure that they take personal responsibility for pregnancy-related complications and hence, take appropriate timely actions in the event of complications. It is also an essential link in the household to-hospital continuum of care. Antenatal coverage has significantly improved with time, but the quality of care failed to meet the required standards. While pregnant women's contact with health care providers paves opportunity to provide health information and education that can significantly improve the health of mothers and their infants, often inadequate attention is given to informing and educating pregnant women at antenatal clinics. In simulation of focused antenatal care study conducted in Africa, health education and counseling took about 15 minutes per visit; however, in study conducted in Tanzania, a first visit client was counseled on average for less than two minutes while counseling in revisiting clients did hardly take place at all. Health care providers' punitive attitude and unfriendliness towards pregnant women was also reported as one of the barriers to increasing coverage of ANC (17-20).

The success of primary health care depends on the interaction of health care providers with clients, families and communities. Interactions of health care providers with their clients significantly influence knowledge, adherence to health care providers' information and recommendation, continuation of use, decisions about revisiting the same provider or site and positive "word-of-mouth". Good client-provider interaction involves treating clients with respect and friendliness; two-way communication between provider and clients; making the clients to feel at ease by maintaining privacy, reassuring the client about confidentiality of information etc; asking nonjudgmental questions and focusing on the particular needs and concerns of the client (21-26).

Pregnancy-related risk perception

Health beliefs and perceptions are known to influence health related behavior and practices such as health care seeking behavior, the type of care sought and adherence to health care providers'

advice and treatment. Although studies conducted on pregnancy-related perceptions are very limited, the limited studies revealed that perceptions influence self-care practice, choice of birth attendant and birth place, seeking maternal health services and emergency obstetric care timely in the event of pregnancy complications.(15, 27-30) In a descriptive study conducted in Nigeria, pregnancy risks were perceived as due to spiritual or supernatural activities of evil persons. In terms of risk perception, experience of complicated pregnancies significantly increased perceived overall risk and risk for specific pregnancy outcomes compared to past uncomplicated pregnancies. However, prolonged labour particularly for first pregnancy was perceived as normal while massive bleeding before and after bleeding was even perceived as beneficial. Perception about fever greatly varied with some perceiving it as very serious and others perceiving it not serious. Women's opinion of pregnancy risks varied with age, levels of education, place of residence, and religious affiliations (31, 32).

Studies conducted in Jimma and Dubti towns in Oromiya Regional State and Afar Regional State in Ethiopia revealed differing pregnancy-related risk perceptions among pregnant women across study settings. While study conducted in Jimma town reported 87% of pregnant women perceiving personal risk for childbirth complications, study conducted in Dubti reported only 28.5% of pregnant women perceiving personal vulnerability to pregnancy complications, but the two studies employed different study designs. Besides, both studies did not have a focus on pregnancy-related risk perceptions. Apart from estimating the magnitude of risk perception, both studies did not shed any light on the socio-demographic and obstetric factors that influence risk perceptions due to the fact that the focus of the two studies were skilled care seeking behavior and practice. Therefore, evidence about beliefs and perceptions about pregnancy and pregnancy-related risk/ pregnancy complications is inadequate to inform interventions aimed at enhancing maternal health in general and increasing health care seeking behavior for maternal health services and emergency obstetric care services.(27, 33)

Information about knowledge of obstetric danger signs could also provide some insight about pregnancy-related risk perception indirectly in that telling or describing a given sign and

symptom as obstetric danger sign or otherwise is related to perception about the signs and symptoms. Evidences from different countries consistently showed low awareness about pregnancy complications and complication readiness among pregnant women including women attending antenatal clinics. Analysis of 19 Sub-Saharan Africa countries DHS data revealed that the proportion of women recalling information about potential complications of pregnancy during antenatal care ranged from 6% in Rwanda to 72% in Malawi; in 15 of the 19 countries, less than half of women reported receiving information. EDHS 2005 also showed that only 31% of pregnant women attended antenatal clinic received information on danger signs of pregnancy complications (8, 9). Similarly, studies conducted in Tanzania and Aleta Wendo district of Ethiopia reported that the percentage of pregnant women aware of at least one and two danger signs during pregnancy, delivery and postpartum were only 26%and 30.4%, 23%and 41.3%, 40% and 37.7% respectively; Few women knew 3 or more danger signs (17, 34).

Factors influencing perception towards pregnancy complications

Antenatal visit

Antenatal care use was significantly associated with awareness about danger signs consistently in study conducted in Aleta Wondo of Ethiopia and Tanzania (9, 19). In another study, antenatal counseling on birth preparedness was significantly associated with birth preparedness and complication readiness (35). Contrary to what is expected, study conducted in rural Tanzania reported that Nurse Auxiliaries were three times more likely to inform ANC clients on danger signs than registered/enrolled nurses (36).

Socio-demographic factors:

Awareness about pregnancy complications and complication readiness were consistently associated with maternal education. Study conducted in Sub-Saharan Africa reported that women with secondary education were 35 times more likely to have been advised on obstetric danger

signs compared to uneducated women. In another study, only 11.1% of university graduates were unaware of obstetric danger signs while 69.2% of illiterate women lacked awareness about it. Urban residence was consistently associated with better awareness about pregnancy complications. Whereas, the association between maternal age and awareness about pregnancy complications was inconsistent; study conducted in rural Tanzania reported that the likelihood to have more awareness about pregnancy danger signs significantly increased with age contrary to study conducted by Waaf A and Rasha A. Another study conducted on information provision also reported that older women were 84 times more likely to be advised on danger signs compared to teenagers who have increased pregnancy-related risk. (9, 34, 35, 37)

Evidences about the association between awareness about pregnancy complications and mothers' occupation was inconsitent; study conducted by Waafa A. and Rasha A. reported statistically significant difference between level of awareness about obstetric danger signs and occupation, but study conducted in Tanzania reported nonexistence of such association. While marital status was not associated with women's level of awareness about obstetric danger signs, family size was reported to have significant association with women's awareness about pregnancy complications. (p=0.015) (9, 37).

Obstetric factors

The finding of study conducted in Tanzania showed that the likelihood to have more awareness significantly increased with the number of deliveries. This finding was consistent with the observed statistically significant difference between the level of awareness about obstetric danger signs and number of pregnancies and deliveries in study done by Waafa A and Rasha A(p=0.014) (p=0.028). While institutional delivery was significantly associated with the likelihood to have more awareness, advice to deliver in a hospital was not associated with awareness about danger signs. Pregnant women who experienced complications had significantly lower awareness about danger signs than their counter parts, but but the likelihood to have more awareness significantly increased with being informed of having risks/complications during antenatal care (31, 37).

3. Objectives of the study

General objective

- To identify pregnancy-related risk perception and knowledge of obstetric danger signs among pregnant women attending antenatal clinic

Specific objective

- To determine pregnancy-related risk perceptions among pregnant women attending antenatal clinic
- To determine knowledge of obstetric danger signs among pregnant women attending antenatal clinics
- To determine socio-demographic and obstetric factors associated with risk perceptions and knowledge of danger signs of pregnancy

4. Methods

4.1 Study Setting

The study area of this thesis was Wolisso district located in South West Shoa Zone of Oromiya Regional State. Oromia Regional State is one of the nine regional states of Federal Democratic Republic of Ethiopia. It is the largest regional state both in terms of its population size and geographic area. The regional state shares geographical boundary with all the regional states of Federal Democratic Republic of Ethiopia except Tigray regional state. It has a total population of 30,305,980 according to the projection of 2007 census report, where the majority of the population is predominantly rural. Administratively, the region is divided into 18 zones and 304 districts having regional government and local governments.

Wolisso district is one of the districts in Oromia regional state located in the central part of the region. The district capital, Wolisso town, which is also the zonal capital, is located at a distance of 114 KM away from Addis Ababa in the Southwest direction. According to the projection of 2007 census report, the total population of the district was 195,284, out of which 78% were rural residents. In the district, one semi-public and nonprofit making hospital, four public health centers and 16 health posts provide antenatal care services to the district population. There were also private clinics in the district, but their services were mainly focused on curative service and their involvement in the provision of routine antenatal care was very limited.

4.2 Study design

Study design

A cross-sectional study based in health facility with internal comparison was conducted to assess ANC clients' pregnancy risk perception and knowledge of obstetric danger signs.

4.3 Source population and study population

Source Population

The source population of the study was pregnant women attending antenatal clinic in Wolisso district, Southwest Shawa zone of Oromia Regional State.

Study participants

The study population of the study were all pregnant women who had antenatal care follow up in four selected health facilities during the above mentioned study period. One health center was excluded from the study due to its very low ANC clients. It had only 6 ANC clients per month on average during the three months preceding the study period, which could not justify spending resources for the collection of data from this specific health facility.

Inclusion criteria

- Women who were pregnant and had antenatal consultation at antenatal clinic
- Women who were mentally capable to give consent and to be interviewed
- Permanent residents of the study area

Exclusion criteria

- Pregnant women who had pregnancy complications that require urgent medical attention as determined by the data collectors who were professional nurses.

4.4 Sample size determination

The sample size for the first objective was calculated with the following assumptions.

1. 50% risk perception which gives the largest sample size was assumed due to lack of estimate of level of pregnancy related risk perception.
2. Considering a confidence level of 95% and using sample size formula for single population proportion, the sample size needed was calculated to be 385.

The second objective was calculated with the following assumptions.

1. 31% of pregnant women attended antenatal clinic were assumed to have knowledge of danger signs based on EDHS 2005 estimate.
2. Considering a confidence level of 95% and using sample size formula for single population proportion, the sample size needed is calculated to be 329.

The third objective was determined with the following assumptions.

1. Several literatures revealed that education is the strongest predictor of awareness about obstetric danger signs while studies on factors associated with risk perception is lacking. (13, 34, 37, 38)
2. According to EDHS 2005 report, 62.5% of antenatal clients who had awareness about signs of pregnancy complications were women who had education. Among antenatal clients who had no awareness about pregnancy complications, 43.7% % were educated.(8)
3. Considering 95% confidence level and the power of the study to be 80%, the sample size for cases (ANC clients having awareness about pregnancy complications) was calculated using Epi Info version 3.5.1to detect odds ratio equal to 2.

Assuming the ratio of ANC clients having awareness about pregnancy complications to ANC clients lacking the awareness to be 1 to 2, and expected frequency of exposure among cases and controls to be 62.5% and 43.7% respectively, the sample needed for the study becomes 270, where 90 of them were cases and 180 of them were controls.

Out of the two sample sizes calculated for the study, the largest sample size, 385, was taken to assure adequate sample size for all the objectives of the study. In addition, a non response rate of 10% was considered and a final sample size of 424 was determined.

4.5 Sampling Procedure

In this study, all the health centers and hospital in the district that provide ANC services were included in the study except Hobi health center that had an average of only 6 ANC clients per month during the last three months preceding the study. First, the average weekly ANC client load of the selected health facilities for the last three months preceding the study period was determined based on analysis of data obtained from ANC records and reports of the facilities. Then, the number of study subjects required from each of the stated health facilities was determined using proportional allocation of the total sample size to the average weekly client load of each health facilities. To compensate for the low ANC clients' load and to minimize the cost of data collection, all pregnant women who had ANC in the selected health facilities during the data collection were recruited until the sample required from each facility were recruited.

4.6 Data Collection

Development and pre-testing of data collection instrument

The data collection instrument used for the study comprised of 43 items with structured questionnaires and variables that measure the study objectives. The variables included in the questionnaire were socio-demographic characteristics, obstetric characteristics and pregnancy-related risk perceptions, client-provider interaction and information provision on obstetric danger signs. The questionnaire was developed based on literature review in English and translated to Afan Oromo by the principal investigator to avoid language barriers and to facilitate easy administration. It was then pre-tested in a district adjacent to the study setting; 15 pregnant women were interviewed to assess for clarity, comprehensiveness, cultural acceptability and relevance of the questionnaire and also to familiarize the data collectors with the questionnaire and interviewing skills. Accordingly, necessary amendments were made prior to data collection.

Recruitment and training of data collectors and supervisors

Six female nurses who were competent in the local language and culture were recruited, trained and deployed for the data collection. The training was given for one day on overall purpose of

the study, interviewing skills, filling the questionnaire, research ethics etc using lecture method and role play. The data were collected through face-to-face interview.

Data quality control

Two nurse data collection supervisors were recruited, trained for one day and deployed for the supervision of data collection process. The completeness and consistency of the data, the proper implementation of sampling techniques and adherence to ethical guideline for the study were also daily checked and followed by the supervisors and the principal investigator. The supervisors checked the quality of the data by recollecting data from 10% of the study subjects interviewed by the data collectors.

Besides, in the recruitment of supervisors, individuals who have supervisory role over the selected health facilities were avoided to minimize the bias that could be introduce into the study. Similarly, the data collectors were assigned to health facilities in which they did not normally provide any service. First each of the questionnaires filled during data collection was carefully checked for completeness, consistency and proper coding of the questionnaire. During the design of data entry template, skip pattern and range of values was established to control the entry of irrelevant data. Then, the data were entered to EPI INFO version 3.5.1 and exported to Statistical Package for Social Sciences (SPSS) version 15.0 for data cleaning and analysis. A check for errors was then made and any errors identified were corrected by referring to the original data.

4.7 Data Analysis

Description of the study population was made using frequencies and percentages derived from univariate analysis in relation to socio-demographic and other relevant variables. Provision of information and client-provider interaction at antenatal clinic were described using percentages by carrying out univariate analysis. Prevalence of risk perception was determined using descriptive statistics (frequency) of analyze menu in SPSS software. Number of obstetric danger

signs during pregnancy, labour/ childbirth and post partum period spontaneously mentioned by respondents were separately determined using compute in transform menu of SPSS software and recoded in to mentioning two or more obstetric danger signs coded as '1' and not mentioning two or more danger signs coded as '0' using recode in to different variable function of transform menu in SPSS software. Then, the prevalence of knowledge of two or more danger signs during pregnancy, labour/ childbirth and postpartum period were determined using descriptive statistics (frequency) of analyze menu in SPSS software.

The distributions of the dependent variables, knowledge of obstetric danger signs and pregnancy-related risk perception, on the independent variables were analyzed by carrying out bivariate analysis. Factors that were significant on bivariate analysis were included in multivariate analysis for risk perception, but in addition level of antenatal care use was included in the model considering its significance although it had no association on bivariate analysis. For the knowledge of danger signs of pregnancy, all factors except husbands' education that were significant on bivariate analysis were included in the multivariate analysis. Husbands' education is ignored as it has substantially reduced the model's ability to predict knowledge of danger signs. Presence of interactions among independent factors included in multivariate logistic regression associated with each of the dependent variables, risk perception and knowledge of obstetric danger signs, were checked by comparing independent effects and joint effects of the independent variables on the two dependent variables separately. Odds ratio was used to see the relative effects of the covariates. No interaction among the different independent variables was assumed when the joint effects of the independent variables on the dependent variables were less than the sum of the independent effects of the particular independent variables.

Statistical tests were considered significant if the two-sided P-value was less than 0.05 at 95% confidence level or alternatively, if the 95% confidence interval of adjusted odds ratio did not embrace odds ratio equal to 1.

4.8 Variables

Dependent Variables

- Pregnancy related risk perception
- Knowledge of obstetric danger signs

Independent Variables

- Socio-demographic factors (age, marital status, religion, ethnicity, education, occupation, place of residence, ownership of mass media device)
- Obstetric factors (gravidity, parity, gestational age, past history of pregnancy complications, history of pregnancy complications during current pregnancy, level of ANC use and past history of institutional delivery)
- Social influence (husband's education and occupation and family size)
- Client-provider interaction (privacy, confidentiality, attitude of ANC provider, adequacy of consultation time, provision of information, presence of interactive communication)

Operational definitions

Pregnancy risk perception: perception of susceptibility to pregnancy complications.

Good client-provider interaction: includes treating clients with respect, maintaining privacy and confidentiality during antenatal consultation, presence of interactive communication and adequate consultation time between clients and antenatal care providers. Good client-provider interaction instead of quality of antenatal counseling and education defined.

5 Ethical Considerations

Ethical approval was obtained from the ethical committee of University of Gondar and Addis Continental Institute of Public Health in the form of support letter that enables the investigator to obtain support from concerned bodies in accessing the data needed for the study. Similarly, ethical clearance was obtained from Oromia Regional Health Bureau, South West Shoa zone health department and Wolisso district health office. Further, oral consent was obtained from the study subjects with provision of adequate information on the purpose of the study and their right to participate in the study or no to. They were also informed their right to discontinue the interview or to skip questions they did not want to answer.

All interviews were conducted in a private set up and the confidentiality of the information was assured by omitting names and other personal identifiers during data collection. All the data collected were put in safe place and used for the purpose of the study only. Appropriate data quality assurance techniques and strategies were properly employed throughout the research process to guarantee the validity of the result. On the other hand, pregnant women who lacked awareness about pregnancy complications and those who had misconceptions about pregnancy-related risk were given information and education on risks associated with pregnancy, signs of danger and the importance of skilled attendant at birth. Finally, I declare that there was no risk posed to the study participants as a result of the study.

6. Results

6.1 Socio-demographic characteristics of respondents

Three public health centers and one semipublic hospital that cater antenatal care services to pregnant women in Wolisso district of Oromiya Regional State were included in the study. All the selected health facilities deployed health care providers of similar professional level for the delivery of antenatal care services and hence, the quality of antenatal care service provided in the hospital and health centers was assumed to be similar. The study recruited a total of 434 pregnant mothers attending antenatal clinics of the selected health facilities, where the study subjects were recruited proportional to the client loads of each of the selected health facilities. The response rate was 98%. Of all the respondents, 29.3% of them received antenatal care once while only 15.4% had 4 or more antenatal care visits. The median age of the respondents was 24 years while the age of the respondents ranged from 16 to 40 years.

The great majority (98%) of them were married or in union. About 60% of the mothers were literate while literacy rate among their husbands was 78.5%, out of which 33.5% had secondary education or above. The majority of the respondents were rural (60.8%). Being housewife was the main occupation for the majority of the respondents (78%) while farming was the dominant occupation for their husbands (58.6%). The occupation of the husbands of 13.3%, 11.7%, 13.1% and 3.3% of the mothers were government employee, employee of private enterprise, merchant and other forms of employment respectively. With regards to ethnicity and religion, the majority (74.9%) of them were Oromo while three-fourth of the respondents were followers of Orthodox Christianity or protestant religion. Although media use habit was not assessed, 71% of respondents had mass media device.

Table 1: Socio-demographic characteristics of respondents, ORS, Wolisso, May 2011

Socio-demographic characteristics of respondents	Frequency	Percent
Age		
15-19 years	66	15.2
20-34 years	339	78.1
>=35 years	29	6.7
Educational level		
Never attended	175	40.3
Primary education	175	40.3
Secondary education and above	84	19.4
Ethnicity (n=433)		
Oromo	325	74.9
Guraghe	69	15.9
Amhara	37	8.5
Tigre	3	0.7
Religion (n=433)		
Orthodox	220	50.8
Protestant	108	24.9
Muslim	72	16.6
Other	33	7.6
Occupation		
Housewife	339	78.1
Merchant	30	6.9
Government employee	30	6.9
Employee of private enterprise	20	4.6
Other	15	3.5

6.2 Obstetric characteristics of respondents

Thirty five percent of the respondents were pregnant for the first time while 16% (69) of them were pregnant at least for the fifth time. 65% (282) respondents had childbirth experience, out of which 45.3% had given birth in health institution sometime in the past. All of the mothers were asked whether they faced any health problem related to their current pregnancy. 27.4 % (118) of them reported that they had health problem they attributed to their current pregnancies. Mothers who were pregnant in the past were further enquired about complications during any of their past pregnancies. Accordingly, 23.3% of them reported complications in the past.

Table 2: Obstetric characteristics of respondents, ORS, Wolisso district, May 2011

Obstetric characteristics of respondents	Frequency	Percent
Gravidity		
Gravida I	151	34.8
Gravida II	87	20.0
Gravida 3-4	127	29.3
Gravida 5 or more	69	15.9
Parity		
Nullipara	152	35.0
Para I	91	21.0
Para II	77	17.7
Para III or more	114	26.3
Level of ANC use		
Once	127	29.3
Twice	133	30.6
Three times	107	24.7
>= 4 times	67	15.4

6.3 Pregnancy related risk perception among pregnant women attending antenatal clinic

6.3.1 Perception of susceptibility to risk and beliefs about home delivery

Pregnancy though natural, it is associated with many complications that can endanger the mother's life in the absence of timely and quality emergency obstetric care. Evidences revealed that every pregnancy is at risk of complications. All pregnant mothers attending antenatal clinic were asked their opinion about the statement 'every pregnancy is at risk of potentially severe pregnancy complications'. Out of all respondents, only 36% (154) of them believed that every pregnancy is at risk of potentially severe pregnancy complications. When they were asked about their personal vulnerability to such risk during their current pregnancy, only 18% (77) of all the respondents acknowledged that they were at risk of such complications.

Home delivery in unsafe and unhygienic conditions by unskilled birth attendants poses significant risk to pregnant mothers and newborns. To assess perception about the risk of home delivery, mothers were asked their opinion about the statement 'home delivery put the health and the life of pregnant women at risk'. All the mothers were further asked their opinion about the statement 'home delivery is uneventful provided that ANC provider told the mother that the pregnancy is in good condition'. Accordingly, 70% of the respondents believed that home deliver put the health and the life of pregnant women at risk while the rest didn't acknowledge it. However, more than half of the respondents agreed with the statement 'home delivery is uneventful provided ANC provider told the mothers that the pregnancy is in good condition'.

6.3.2 Factors associated with perception of susceptibility to risk of pregnancy

Past and current history of pregnancy complications increased risk perception by 3 folds and 13 folds respectively. Specifically, complications of pregnancy experienced during current pregnancy that significantly increased perceived susceptibility to pregnancy related risk were: vaginal bleeding (OR= 5.16, 95%CI= 2.07-12.89), swelling of the face, fingers and body (OR= 9.08, 95%CI= 3.94-20.93), severe headache (OR= 6.12, 95%CI= 3.40-11.00), high fever (OR=

10.55, 95%CI= 5.02-22.17), breathlessness (OR= 9.17, 95%CI= 4.88-17.25) and absence of fetal movement (OR= 9.29, 95%CI= 3.02-28.58).

Mothers who gave birth in health institution in the past were less likely to perceive pregnancy related risk while level of antenatal care use had no association with perceived susceptibility to pregnancy related risk. However, receiving of information on danger signs at antenatal clinic increased risk perception by two folds. Similarly, spontaneously mentioning of two or more danger signs during pregnancy also increased risk perception by 3 folds. Mothers who owned TV or Radio were less likely to perceive risk compared to mothers who didn't have TV/Radio, but ownership rather than media use habit was assessed. Among the factors significantly associated with perceived susceptibility to pregnancy related risk on bivariate analysis, only history of pregnancy complications during current pregnancy was significantly associated with risk perception on multivariate analysis. Although level of ANC use was not associated with risk perception on bivariate analysis, use of antenatal care for four times or more was significantly associated with risk perception on multivariate analysis.

Table 3: Association of selected socio-demographic and obstetric characteristics of respondents with perception of susceptibility to pregnancy risk, Oromiya Regional, State, Wolisso, district, May 2011

Variables	Perceived susceptibility to risk		Crude OR (95%:CI)	Adjusted OR (95%:CI)
	Yes N(%)	No N(%)		
Level of ANC use				
Once	24(31.2%)	103(28.9%)	1.00	1.00
Twice	19(24.7%)	114(32.0%)	0.72(0.37, 1.38)	0.72(0.26, 1.95)
Three times	15(19.5%)	92(25.8%)	0.70(0.35, 1.41)	0.96(0.33, 2.82)
Four times or more	19(24.7%)	47(13.2%)	1.74(0.87, 3.47)	**3.60(1.20, 10.81)**
Received information on danger signs				
Yes	15(19.5%)	37(10.4%)	**2.09(1.08, 4.03)**	0.83(0.23, 2.96)
No	62(80.5%)	319(89.6%)	1.00	1.00
Knew >= 2 danger signs during pregnancy				
Yes	35(45.5%)	82(23.0%)	**2.79(1.67, 4.65)**	1.48(0.64, 3.44)
No	42(54.5%)	274(77.0%)	1.00	1.00
Past history of institutional delivery				
Yes	15(31.9%)	111(50.2%)	**0.51(0.26, 0.99)**	0.58(0.26, 1.31)
No	32(68.1%)	120(49.8%)	1.00	1.00
Past history of pregnancy complications				
Yes	21(44.7%)	44(19.0%)	**3.45(1.78, 6.69)**	1.95(0.85, 4.50)
No	26(55.3%)	188(81%)	1.00	1.00
Complication during current pregnancy				
Yes	56(72.7%)	62(17.5%)	**12.56(7.09, 22.24)**	**9.90(4.40, 22.22)**
No	21(27.3%)	292(82.5%)	1.00	1.00
Ownership of TV/Radio				
Yes	46(59.7%)	161(62.9%)	**0.54(0.32,-0.90)**	0.51(0.24, 1.10)
No	31 (40.3%	95 (37.1%)	1.00	1.00

❖ All the factors that were significantly associated with risk perception were included in multivariate analysis. Level of antenatal care use was though not significant on bivariate analysis, it was included in multivariate analysis considering the important role of optimal use of antenatal care in enhancing knowledge and perception of pregnancy-related risk.

6.4 Information provision at ANC clinic and mothers' knowledge of danger signs

6.4.1 Information provision at antenatal clinic

All mothers were asked to whether they received any health information and education from their antenatal care providers or not. 81.4% of them reported receiving general health information and education (95%CI= 77.3%, 84.7%). Mothers who reported receiving health information and education at the antenatal clinic were further asked to spontaneously mention the message they received. They were probed to mention additional messages they received until they exhaust all the information they received. Accordingly, only 12% of them received information on obstetric danger signs (95%CI= 8.9%, 15.1%).

6.4.2 Knowledge of danger signs among pregnant women attending antenatal clinic

All the respondents were sequentially asked to spontaneously mention danger signs during pregnancy, labour/ childbirth and after delivery that they knew. Accordingly, 35%, 34.1 and 40.3% of them spontaneously mentioned at least one danger sign during pregnancy, delivery and postpartum period respectively (95%CI= 30.5%, 39.5%; 29.5%, 38.5% and 35.4%, 44.6%). The danger signs during pregnancy spontaneously mentioned were: vaginal bleeding (11.3%), swelling of the face/finger/body (11.8%), severe headache (15.9%), blurring of vision (9.9%), fever (8.8%), absence of fetal movement (10.6%), breathlessness (12.4%) and abnormal body movement (1.4%). Other signs were mentioned as signs of danger during pregnancy by 15 mothers (3.5%).

Similarly, danger signs during labour/childbirth spontaneously mentioned by the mothers were: vaginal bleeding (11.1%), prolonged labour (28.1%) and abnormal body movement (1.4%). Other signs were mentioned as signs of danger during labour/ childbirth by 9 mothers (2.1%). Whereas, danger signs during postpartum spontaneously mentioned were: excessive vaginal bleeding (17.3%), delayed placental expulsion (23.7%), fever (12.4%), foul smelling lochia (2.1%) and abnormal body movement (2.1%). Other signs were mentioned as signs of danger during postpartum period by 8 mothers (2.1%).

Mothers who knew two or more danger signs during pregnancy, delivery and postpartum period were only 27%, 6% and 14.5% respectively.

6.4.2.1 Factors associated with knowledge of two or more danger signs during pregnancy

Both mothers' secondary education or more and husbands' secondary education or more increased the likelihood to know two or more danger signs by three folds compared to mothers who lacked formal education and mothers whose husbands didn't have formal education respectively. Whereas, husbands' being government employee and employee of private enterprise, increased the likelihood to know two or more danger signs by 3 folds and 4 folds respectively compared to being a farmer. These may be due to such husbands' involvement in maternal and child health in terms of encouraging and supporting their wives to seek skilled care and in the acquisition of information for provision of necessary support needed for safe pregnancy and motherhood.

Urban mothers were three times more likely to know two or more danger signs compared to rural dwellers. Both past and current history of pregnancy complications increased spontaneously mentioning two or more danger signs by three folds. While 4 or more ANC use increased spontaneously mentioning two or more danger signs by two folds compared to single ANC use, receiving information on danger signs at antenatal clinic increased the likelihood to know two or more danger signs by 19 folds. Mothers who had six or more family size were significantly less likely to know two or more danger signs compared to mothers who had two or less family size (OR= 0.47, 0.94).

On multivariate analysis, urban residence, receiving information on danger signs, complications during current pregnancy, two and three ANC visits were significantly associated with spontaneously mentioning at least two danger signs. However, four or more antenatal care visit was not associated with mentioning two or more danger signs.

Table 4: Association of selected socio-demographic & obstetric characteristics of respondents with knowledge of 2 or more danger signs during pregnancy Oromiya Regional, Wolisso, district, May 2011

Variables	Knew two or more danger signs		Crude OR (95%:CI)	Adjusted OR (95%:CI)
	Yes N(%)	No N(%)		
Mothers' education				
None	36(30.8%)	139(43.8%)	1.00	1.00
Primary	42(35.9%)	133(42.0%)	1.22(0.74, 2.02)	1.26(0.62, 2.58)
Secondary or above	39(33.3%)	45(14.2%)	**3.35(1.90, 5.88)**	2.43(0.68, 8.69)
Place of residence				
Urban	71(60.7%)	99(31.2%)	**3.40(2.19, 5.28)**	**4.41(1.73, 11.19)**
Rural	46(39.3%)	218(68.8%)	1.00	1.00
Husbands' education				
None	17(14.8%)	74(23.3%)	1.00	
Primary	44(38.3%)	147(46.4%)	1.30(0.70, 2.44)	
Secondary or above	54(46.9%)	88(27.8%)	**2.67(1.43, 5.00)**	
Husbands' occupation				
Farmer	46(40.4%)	200(65.4%)	1.00	1.00
Merchant	12(10.5%	43(14.1%)	1.21(0.59, 2.48)	0.28(0.08, 1.00)
Government employee	24(21.1%)	32(10.5%)	**3.26(1.76, 6.05)**	0.71(0.17, 2.94)
Private enterprise employee	24(21.1%)	25(8.2%)	**4.17(2.19, 7.96)**	1.49(0.50, 4.84)
Other	8(7.0%)	6(1.9%)	**5.80(1.92, 17.52)**	3.58(0.40, 31.98)
Level of ANC use				
Once	26(22.2%)	101(31.9%)	1.00	1.00
Twice	39(33.3%)	94(29.7%)	1.61(0.91, 2.85)	**3.25(1.34, 7.93)**
Three times	29(24.8%)	78(24.6%)	1.44(0.79, 2.65)	**3.31(1.29, 8.49)**
Four times or more	23(19.7%)	44(13.9%)	**2.03(1.05, 3.94)**	1.50(0.46, 4.94)
Received information on danger signs				
Yes	25(21.4%)	27(8.5%)	**19.17, (4.63,79.39)**	**4.76(1.74, 13.08)**
No	92(78.6%)	290(91.5%)	1.00	1.00
Past history of pregnancy complications				
Yes	27(37.0%)	38(18.3%)	**2.75(1.52, 4.97)**	1.71(0.80, 3.66)
No	44(63.0%)	170(81.7%)	1.00	1.00
Complication during current pregnancy				
Yes	54(46.2%)	64(20.4%)	**3.35(2.12, 5.28)**	**2.90(1.30, 6.50)**
No	63(53.8%)	250(79.6%)	1.00	1.00
Perceived susceptibility to risk				
Yes	35(29.9%)	42(13.3%)	**2.79(1.67, 4.65)**	1.45(0.58, 3.62)
No	82(70.1%)	274(86.7%)	1.00	1.00

Controlled for family size, but husbands' education is not included as it reduced the model ability to predict knowledge much.

6. 4.3 Client-provider interactions at antenatal clinic

Good client-provider interaction involves two-way communication, treating clients with respect, making clients feel at ease, asking nonjudgmental questions, respecting their personal circumstances and focusing on clients' particular situation. In this study, mothers were asked whether they were treated with respect, whether they had concern for privacy, whether they were given the chance to ask questions, whether they asked their ANC providers any question and whether the antenatal consultation time was adequate or not in order to assess the availability of enabling conditions at antenatal clinic for empowerment of pregnant women on pregnancy-related risks.

The great majority (95.6%) of antenatal clients were treated with respect by their ANC providers. Reported auditory privacy and visual privacy were also 85.8% and 88.1% respectively while overall privacy was 79.7%. However, the interaction between providers and clients short falls of unidirectional communication and time constraint. 68.9% of the respondents were offered the chance to ask to ask questions while only 33.9% of all the respondents actually forwarded any question to their ANC providers. On the other hand, the antenatal consultation time was reported to be adequate by 60.2% of the respondents.

7. Discussion

The study finding shows low perception of susceptibility to pregnancy related risk (18%) and relatively low awareness about obstetric danger signs among pregnant women attending antenatal clinic. Knowledge of one and two or more danger signs during pregnancy, delivery and postpartum period were only 35% and 27%, 34.1% and 6%, 40.3% and 14.5% respectively while only 12% of the mothers received information on danger signs at antenatal clinic. On a multivariate analysis, risk perception was significantly associated with four more antenatal care visits and experience of complications during current pregnancy compared to single ANC visit and mothers who had uneventful pregnancy respectively. Whereas, knowledge of two or more danger signs during pregnancy was significantly associated with urban residence, use of antenatal care for two times and three times, receiving information on danger signs at antenatal clinic and history of pregnancy complications during current pregnancy. ANC use for four times or more was not associated with knowledge on multivariate analysis.

While 36% (95%CI= 31.5%, 40.5%) of the mothers believed that every pregnancy is at risk of potentially severe pregnancy complications, only 18% (95%CI= 14.5%, 21.6%) of the mothers had perceived susceptibility to such risk indicating denial of personal risk. The perceived susceptibility to pregnancy-related risk identified in this study is lower than study conducted in Jimma and Dubit in Oromiya and Afar, which reported 87% and 28.5% perceived susceptibility to complications among pregnant mothers respectively. The difference could be related to difference in background characteristics of respondents and presence or absence of interventions. The study conducted in Jimma recruited only urban women who are likely to have better access to information on pregnancy related risk from health care providers, mass media and social networks in contrast to this study in which rural residents were the majority. Besides, it may be related to bias due to high non response rate reported as a limitation by the investigator (27, 33).

On the other hand, 70% of the respondents believed that home deliver put the health and the life of pregnant women at risk while more than half of the respondents believed that ‘home delivery is uneventful for pregnant mothers who were told by ANC providers that their pregnancy is in

good condition'. The perceived risk of home delivery is low compared to study conducted in Bangladesh, in which 81% mentioned home delivery as a risk.(39) The difference could be due to the increased uptake of antenatal care in Bangladesh and presence or absence of other interventions.

The study revealed that four or more antenatal care visits and experience of pregnancy complications during current pregnancy were significantly associated with increased risk perception compared to single antenatal care visit and uneventful pregnancy after controlling for possible confounders. This could be due to increased opportunity to learn about pregnancy-related risk with increasing antenatal consultations. It might also be due to reverse causation or optimal use of antenatal care services due to risk perception as there is no baseline on risk perception prior to antenatal care use. The increased risk perception among mothers who had complications during the current pregnancy compared to mothers who didn't have such experience might be due to receiving information on personal risk during their antenatal consultations.

Ownership of TV or Radio had no influence on risk perception although there seems to be some association on bivariate analysis. In contrast to what is expected, mothers who gave birth in health institution in the past were significantly less likely to perceive pregnancy related risk on bivariate analysis although institutional delivery facilitate provision of information on pregnancy related risk,. This could be related to missed opportunities to empower pregnant women to recognize pregnancy-related risk. On the contrary, it might be simply due to other confounders. Study conducted on factors associated with pregnancy-related risk perception is lacking to compare the finding of this study with other studies.

Counseling and educating pregnant women on obstetric danger signs by health care providers at antenatal clinic was very limited; while 81.4% of the ANC clients reported receiving general health information and education, only 12% of the clients reported receiving information on

danger signs. The provision of information on danger signs is very low in absolute terms given that the national reproductive health strategy of Ethiopia accords high value to empowering pregnant women, men, families, and communities to enable them recognize pregnancy-related risks and to take responsibility for developing and implementing appropriate responses. While the low information provision at antenatal clinic is consistent with literatures, it is lower than EDHS 2005 national estimate (31%) while data disaggregated by region is lacking to compare with estimate for Oromiya region, preferably study setting. The difference could be due to methodological variation, relatively higher recall bias associated with EDHS result and possible local variations. Likewise, the study finding is lower than the result of study conducted in private for profit health facilities in Addis Ababa. While the difference could be due to observed difference in the professional level of antenatal care providers, study subjects' background characteristics and the quality of client-provider interactions between the two studies may also explain the variations (8, 28).

Assessment of mothers' knowledge about danger signs also triangulated the low information provision at antenatal clinic though it is negatively and positively influenced by recall bias and mothers' previous knowledge respectively. Mother who knew at least one danger sign during pregnancy, delivery and postpartum were only 35%, 34.1% and 40.3% respectively while mothers who knew two or more danger signs during pregnancy, delivery and postpartum were even lower, amounting to only 27%, 6% and 14.5% respectively. Compared to study conducted in Adigrat town in Tigray region which reported 15.4% and 2.6%, 23.8% and 7.3%, 17.2% and 1.7% knowledge of one danger signs and two or more danger signs during pregnancy, labour/ childbirth and postpartum period respectively, the results of this study are relatively higher except for knowledge of two or more danger signs during pregnancy and labour/ childbirth. The difference could be related to methodological differences and absence or presence of interventions. While this study recruited only mothers who had antenatal care, the comparison study included all mothers who gave birth within 12 months preceding the study regardless of their ANC use status. Besides, the comparative study assessed knowledge of selected signs only.

In this study, urban women were more likely to know two or more danger signs during pregnancy compared to rural women (AOR= 4.41, 95%CI= 1.73, 11.19). This is consistent with other studies that reported better reproductive health knowledge, practice and reproductive health status among urban women.(8, 40, 41). This could be related to urban women's better access to information including mass media, contact with health care providers and social networks. Mothers who experienced complications during their current pregnancy were more likely to know two or more danger signs compared to their counterparts (AOR= 2.90, 95%CI= 1.30, 6.50). While this finding is consistent with study conducted elsewhere, which reported increased health care-seeking during delivery among mothers who experienced complications, it contradicts with the other (37, 42). Better knowledge among mothers who had complications could be due to learning from own experience, increased efforts to acquire information by such women and selective information provision on danger signs by antenatal care providers on the basis of risk screening. On the other hand, the difference between this study and the contradicting literature could be related to difference in antenatal counseling and education.

For obvious reason, mothers who received information on danger signs at antenatal clinic were more likely to be knowledgeable about two or more danger signs compared to their counterparts (AOR= 4.76, 95%CI= 1.74, 13.08). This is consistent with other studies, which revealed increased awareness about danger signs, self-care during pregnancy and newborn care among ANC clients reached with IEC interventions compared to ANC clients not reached with such interventions (20, 43). Consistent with literature, mothers who had two and three antenatal care visits were more likely to know two or more danger signs compared to mothers who had single ANC visit (AOR=3.25, 95%CI= 1.34, 7.93; AOR= 3.31, 95%CI= 1.29, 8.50) (37, 38, 41). This could be due to increased chance of receiving information on danger signs with repeated antenatal care. It may also be due to increased likelihood to absorb information provided at antenatal clinic repeatedly by antenatal clinic clients. However, mothers who had four or more antenatal care visits were not more knowledgeable about danger signs compared to mothers who had a single antenatal care visit. This might be due to the low number of clients who had four or more antenatal care visit, which in turn negatively affect the power to detect differences.

While mother's age, education, parity and past institutional delivery were significantly associated with knowledge of danger signs in study conducted in Tanzania, all of them had no association with knowledge of two or more danger signs during pregnancy in this study. This could be related to potential confounders. Although urban residence is strongly associated with awareness about obstetric danger signs, the comparative study has not controlled for this important confounder (38). Besides, the association between past institutional delivery and knowledge of two or more danger signs may simply reflect institutional delivery among mothers who already had knowledge of danger signs of pregnancy.

Though husbands' education and occupation had no association with mothers' knowledge of danger signs on multivariate analysis, husbands' secondary education or more, being government employee and employee of private enterprise increased knowledge of two or more danger signs during pregnancy by 3 folds, 3 folds and 4 folds compared to husbands who had no formal education and in the farming occupation respectively. This is consistent with studies conducted elsewhere, which reported increased uptake of maternal health care among the wives of husbands who had general education or specific education on maternal health and those who had involvement in business or services (44, 45)

In this study, the great majority (95.6%) of antenatal clients were treated with respect by their ANC providers. Though the possibility for courtesy bias is evident in Ethiopian culture, it is unlikely to contribute much as the e data was collected in a private setup by data collectors who had no role in the health facilities visited by the clients. On the other hand, reported auditory privacy and visual privacy were 85.8% and 88.1% respectively with an overall privacy of 79.7%. However, the interaction between providers and clients were mostly unidirectional and short falls of time constraint; though 68.9% of the respondents reported an offer to ask questions, only 33.9% of all the respondents actually forwarded any questions to their ANC providers, but offering a chance to ask question increased the likelihood of asking questions by four folds (OR= 3.557, 95%CI= 2.149-5.886).

Compared to study conducted in private for profit health facilities in Addis Ababa, slightly higher number of mothers participated in this study reported treatment with respect and politeness while the reported privacy, dynamic interaction between clients and providers and reported adequacy of antenatal consultation time in this study were much lower. However, compared to study conducted in Dubti in Afar, client treatment with respect is slightly higher while privacy is much higher. These could be due to difference in the professional level of health care providers, cultural influences and backgrounds of the respondents such as educational level, self confidence and communication skills. While service providers in the private for profit included obstetricians/ gynecologists and general medical practitioners, the involvement of such senior professionals in the provision of antenatal care was very limited in the study setting(27, 46).

Strengths and limitations

This study has strength in that it has generated useful evidences for designing and implementation of IEC/BCC interventions to promote maternal health. Besides, qualified data collectors and supervisors were employed for the data collection and data quality control. The response rate of the study is also very high (98%). However, it has the following limitations. Significant proportion of pregnant women in Ethiopia and in turn in Oromiya do not attend antenatal care. Since the women attending to antenatal care could be different from those not attending, the result of this study cannot be generalized to the district population.

Further, studies conducted on risk-perception are very limited and hence, important confounders of risk-perception might have been ignored in the collection and analysis of data related to factors associated with risk perception. On the other hand, failure to complement the risk-perception with a qualitative study could be another limitation of the study as it is well suited to explore perceptions and issues that are not well studied.

8. Conclusions

Most pregnant women attending antenatal clinic have a false sense of security against pregnancy related risk and lack of awareness about danger signs of pregnancy; rural women were particularly affected by lack of awareness about danger signs of pregnancy although timely recognition of maternal problem is required in the event of complications for the mother and newborn to survive pregnancy complications. However, the study revealed substantial missed opportunities to empower pregnant women on pregnancy related risk despite their evident information needs on pregnancy related risks and danger signs of pregnancy. Nevertheless, optimal use of antenatal care service was significantly associated with pregnancy-related risk perception and knowledge of obstetric danger signs indicating the clear benefit of optimal use of antenatal care services.

9. Recommendations

1. IEC/BCC interventions prioritizing rural population should be strengthened. Ownership of mass media devices is very high and it may constitute an alternative channel of communication; however, media use habit of the audience and preferred time of use needs to be assessed prior to implementation to ensure that the program is successful.

2. Missed opportunities to promote safe motherhood in all contacts with pregnant women should be minimized through establishment of effective system for implementation and tracking of the progress. One such strategy is establishing system for efficient use of health workers providing antenatal care to ensure that adequate time is devoted to informing and educating pregnant women at antenatal clinic. Where human resource constraint is hindering allocation of long time for counseling each pregnant women, effective way of informing and educating pregnant women through the use of simple television and VCD player at waiting place should be considered.

3. Strategies to enhance optimal use of antenatal care should be identified, tested and scaled up.

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Addis Continental Institute of Public Health, Department of Public Health

ANNEX 1 Questionnaire for assessment of the quality of counseling and education given to ANC clients and its implications on pregnancy-related risk perception in Wolisso Woreda, Southwest Shoa Zone, Oromia Regional State

Verbal Consent

Good morning/ good afternoon.

Hello! My name is _____ from Addis Continental Institute of Public Health and Gondar University research team. We are conducting a study in Wolisso district on assessment of the quality of ANC counseling and education and its implications on clients perceptions. Thus, you are kindly requested to participate in the study that helps for improving maternal health service and in turn maternal and child health. The interview will take 40 minutes at maximum. We do not need your personal identifiers such as names and the information you give us will never be shared to other individuals or organizations with your personal identifiers without your agreement. You have the right to participate and the right to refuse to participate. You have also the right to stop in between or to skip some of the questions you would not like to answer or if you feel discomfort to answer any of the questions. Your non participation in the study will not influence the service from this health facility or the health care providers. Your participation is completely voluntary. Your honest answers to the questions are helpful to us for planning health program. If you agree to participate, I will start my interview. May I begin the interview now? 1. Yes 2. No

If the response is yes, continue interviewing; If the response is no, thank her and go to the next respondent.

I the under signed read the consent to the respondent before the interview and also checked for the respondents' understanding of the consent.

Name of interviewer _____Sign._____Date of interview_____

Name of the supervisor_____Sign_____Date of interview_____

Facility code_____ Questionnaire code_____

Name of investigator: Legesse Hirpa Cell phone: 09 11 24 5004/ 0911 3731 65

Inistitiyutii Fayyaa Hawaasaa Aaddis Kontinentaalii
Damee Fayyaa Haawaasaa

ANNEX 1 Gaafiilee qu'annoo quliqulina gorsaa fi barumsa dubartoota ulfaa hordoffi kununsa da'umsa duraa taasisaniif kennamuu fi ilaalcha dubartoonni ulfaa rakkina ulfaa'uu wajjin waliqabatanii uumamu danda'aniif qabanii aanaa Walisoo, Godina Kibba Lixa Shawa, Nannoo Oromiyaa Kessatti gaggessuuf qopheefame.

Waliigaltee/ Eeyyama Afaanii
Akka bultan/ akkam ooltan.

Maqaan koo Obboo _____ yammuu ta'u kanaan dhufee garee qorannoo Inistitiyuutii Fayyaa Hawaasaa Aaddis Kontinentaalii fi Univarisiitii Gondar irrayyu. Yeeroo amma aanaa Walisoo keessatti qorannoo quliqulina gorsaa fi barumsa dubartoota ulfaaf dhaabbilee fayyaa keessatti kennama jiruu fi ilaalcha dubartoonni ulfaa qaban irratti gaggeessaa jira. Qorannoon kuni gorsaa fi barumsa dubartoota ulfaaf kennamuu fi walumaagalatti fayyaa haawwota foyyessuu keessatti fayidaa guddaa qaba. Kanaaf, odeeffannoo nuuf kennuuf fedhii keessanii qorannoo kana keessatti akka hirmaattanan isin afeera. Gaafii fi deebiin waliin taasifinu daqiiqaa 40 fudhata. Maqaa keessanis ta'e odeeffannoo eenyuma keessan addan baasee muli'isu hinbarbaannu. Odeeffannoo isin nuuf kennitan eeyama keessan ala haala nama odeeffannoo nuuf kennee muli'suun YKN beeksisuun nama kamiif iyyuu akkasumas dhaaba kamiif iyyuu hinqoodinu. Icitummaan isaa guutumma guutuutti ni eegama. Hirmaannaan keessani guutummaa guutuutti fedhii irratti kan hundaye. Hirmaachuus ta'e hirmaachuu dhiisuun mirga keessani. Gaafii gaafatamitan keessa kan deebisuu hinbarbaadine yoo jiraate deebisuu dhiisuu YKN bira darbuu ni dandeessu. Walumaa galatti gaafiif deebii keenya yeeroo barbaadan addan kutuuf mirga guutuu qabdu. Qorannoo kana keessatti hirmaachuu dhiisuun keessan bifa kamin iyyu tajaajila dhaaba fayya kana irra argatanii fi haala tajaajilamitan irratti dhiibba YKN rakkina tokko iyyuu hinuumu. Odeeffannoon mirkanaa isin nuuf kennitan sagantaa fayyaa karoorsuuf bu'aa guddaa qaba. Qorannoo kana keessatti hirmaachuuf kan eeyyamtan yoo ta'e gaafii kiyyan eegala. Gaafii fi deebii isin wajjin eegalu nan danda'a? 1. Eeyyee 2. Lakki

Deebiin ishii 'eeyyeen' yoo ta'e gaafii fi deebii itti fufi. Deebiin ishii 'lakki' yoo ta'e, ishii galateefadhuu gara nama itti aanuutti darbi.

Ani kan armaan gaditti mallatteesse, waliigaltee/ eeyyama afaanii armaan olii nama deebii gaafiiwwan qorannoo kanaaf deebii kennuuf akka dhagayanitti isaaniif dubisuu kootii fi isaaniif ifa ta'uu isaa quliqulleessuu koo nan mirkaneessa.

Maqaa raga walitti qaba _____ Mallattoo_____ Guyyaa ragaan sasabame_____

Maqaa suparvayizara_____ Mallattoo _____ Guyyaa ragaan sasabame_____

Koodii Gaaffilee Qorannoo_____

Maqaa Qorataa: Laggasaa Hirphaa Lakkofsa bilbila 0911 2450 04/ 0911 3731 65

Section I. Socio-demographic factors

No.	Questions and Filters	Coding Categories/ Alternative Response	SKIP
101	What is your age?	_____ years	
102	What is your religion?	1. Wakefata 2. Orthodox 3. Protestant 4. Catholic 5. Muslim 77. Other, specify_____	
103	What is your ethnicity?	1. Oromo 2. Amhara 3. Guraghe 4. Tigre 77. Other, specify_____	
104	What is your occupation?	1. Housewife 2. Government employee 3. Employee of private enterprise 4. Merchant 77. Other, specify_____	
105	What is your educational status?	1. Illiterate 2. Grade 1-8 3. Grade 9-12+	
106	Where is your residence?	1. Urban 2. Rural	
107	What is your marital status?	1. Married 2. Single…go to Q110 3. Divorced……go to Q110 4. Widow….go to Q110	

108	What is the educational status of your husband?	1. Illiterate 2. Grade 1-8 3. Grade 9-12+	
109	What is the occupation of your husband?	1. Farmer 2. Merchant 3. Government employee 4. Employee of private enterprise 77. Other, specify_____	
110	What is your family size?	_____	
111	Do you have a radio or TV?	1. Yes 2. No	

Section II. Obstetric Factors

No.	Questions and Filters	Alternative Responses	SKIP
201	How many times have you been pregnant including the current one? (Gravidity)	_____ If it is her first pregnancy, go to question 206.	
202	How many times did you give birth? (parity)	_____ If she didn't give birth in the past, go to question 204.	
203	Did you give birth in health institution in the past?	1. Yes 2. No 99. I don't know	
204	Did you face pregnancy related health problem during your previous pregnancies or deliveries?	1. Yes 2. No 99. I don't know	
205	Did you face any pregnancy-related health problem during the current pregnancy?	1. Yes 2. No….go to Q 207	

		99. I don't know...go to Q 207	
206	What was (were) the problems you faced during the current pregnancy? (multiple responses are possible)	1. Vaginal bleeding 2. Swelling of the face/ hands 3. Severe headache 4. Blurring of vision 5. High fever 6. Breathlessness 7. Decreased/ no fetal movement 77. Other, specify_____	
207	How long is it since you became pregnant?	_____ weeks	
208	What was the duration of your pregnancy by the time you made initial visit for antenatal care?	_____weeks	
209	How many antenatal care visits have you made including your today's visit?	_____	

III. Pregnancy-related risk and risk perception

No.	Questions and Filters	Alternative Response	SKIP
301	Do you think you may face severe pregnancy related risk during your current pregnancy?	1. Yes 2. No 99. I don't know	
302	What is your opinion about the statement 'Every pregnant woman is at risk of potentially life threatening complications? Read the options for the respondent	1. I strongly agree 2. I agree 3. Indecisive 4. I disagree 5. I strongly disagree	
303	What is your opinion about the statement 'home delivery is uneventful for mothers whose pregnancy was	1. I strongly agree 2. I agree	

	regarded in good condition by ANC provider'? Read the options for the respondent	3. Indecisive 4. I disagree 5. I strongly disagree	
304	What is your opinion about the statement 'Home delivery put a pregnant mother at a great risk of pregnancy related problems?' Read the options for the respondent	1. I strongly agree 2. I agree 3. Indecisive 4. I disagree 5. I strongly disagree	

IV. Client-provider interaction

No	Questions and Filters	Coding Categories/ Alternate Responses	SKIP
401	Did the health worker you consulted treat you with respect?	1. Yes 2. No	
402	Do you think other persons can hear the conversation between you and the health worker?	1. Yes 2. No 99. I don't know	
403	Do you think other persons can see you while you were consulting the health worker	1. Yes 2. No 99. I don't know	
404	Did you ask your ANC provider any question?	3. Yes 4. No 99. I don't remember	
405	Did the health worker give you the chance to ask questions?	1. Yes 2. No 99. I don't remember	
406	What do you say about the length of your consultation time with ANC provider?	1. Adequate 2. Fair 3. Too short	

		99. I don't know	

V. Information provision

No.	Questions and Filters	Coding Categories/ Alternative Responses	SKIP
501	Did you obtain health information and education from your ANC provider?	1. Yes 2. No……..go to 505 3. I don't know… go to 505	
502	What were the issues on which you obtained health information and education? Multiple responses are possible: probe	1. Nutrition 2. Danger signs 3. PMTCT 4. Readiness for potential obstetric emergencies 5. Advised to deliver in a health facility 6. Family planning 7. Newborn and child care 8. Prevention of malaria 77. Other, specify_____ 99. I don't know	
503	What are the danger signs of pregnancy that you know? (multiple answers are possible: probe)	1. Bleeding 2. High fever 3. Swelling of the face, fingers and the body 4. Severe headache 5. Blurring of vision 6. Decreased or no fetal movement 7. Breathlessness 8. Convulsion	

		9. Premature rupture of membrane 77. Other, specify_____	
504	What is (are) the danger signs alerting a problem during delivery that you know? (multiple responses are possible: probe)	1. Bleeding during labour 2. Prolonged labour 3. Convulsion 77. Other, specify_____	
505	What are the danger signs alerting a problem after delivery that you know? (multiple answers are possible: probe)	1. Excessive bleeding 2. Delayed delivery of placenta 3. Fever 4. Foul smelling vaginal discharge 5. Convulsion 77. Other, specify_____	

Gafilee Qorannoo Afaan Oromootiin

Kutaa I. Odeeffannoo dhuunfaa fi hawaasummaa

Lakk.	**Gaafilee fi Calaltuu**	**Filannoo Deebii**	**Koodii**
101	Umuriin keessan meeqa?	_____	
102	Amantaan keessan maali?	1. Waqeffataa 2. Ortodokisii 3. Pirotesitaantii 4. Kaatolikii 5. Islaama 77. Kan bira (ibsi) _____	
103	Lammiin keessan maali?	1. Oromoo 2. Amaara 3. Guraagee 4. Tigiree 77. Kan bira (ibsi)_____	
104	Hojiin keessan maalii?	1. Hojii haadhawarraa 2. Hojjattuu mootummaa 3. Hojjattuu dhaabbata dhuunfaa 4. Dalidaaltu 77. Kan bira (ibsi)_____	
105	Sadarkaan barumsa irra geessan ammami?	1. Tasuma hinbaranne 2. Kutaa 1-8 3. Kutaa 9-12+	
106	Bakki jireenya keessanii eessa?	1. Magaalaa 2. Baadiyyaa	
107	Haalli fuudhaa fi heerumaa keessanii attamitti ibsama?	1. Abba warraa qaba 2. Hinheerumine….G110ti 3. Wali-hiikeen jira...G110ti	 darbi darbi

		4. Abbaan warraa du'e jira……..Gaaffii 110ti darbi	
108	Sadarkaan barumsaa abbaan warraa keessan irra ga'an meeqa?	1. Tasuma hinbaranne 2. Kutaa 1-8 3. Kutaa 9-12+	
109	Hojiin abbaa warraa YKN hiriyyaa keessanii maali?	1. Qotee bulaa 2. Daldaalaa 3. Hojjataa mootummaa 4. Hojjataa dhaabbata dhuunfaa 77. Kan bira (ibsi)_____	
110	Baayyinni maatii keessanii meeqa?	_____	
111	Raadiyoo YKN televiziyoona qabdu?	1. Eeyye 2. Lakki	

Kutaa II. Odeeffannoo ulfa'uu wajjin waliqabatanii

Lakk.	**Gaafilee fi Calaltuu**	**Filannoo Deebii**	**Koodii**
201	Kan ammaa dabalatee yeeroo meeqaaf ulfoofitanii beektu?	_____ (Jalqabaaf ulfoofite yoo ta'e gaaffii 206ti darbi)	
202	Amma yoonatti yeeroo meeqa deessanii beektu?	_____ (Tasumaa hindeenye yoo ta'e gaaffii 204ti darbi)	
203	Mana yaalaatti deessani beektu?	1. Eeyyee 2. Lakki 99. Hin yaadadhu	
204	Yeeroo kanaan dura ulfoofitan, rakkinni fayyaa ulfa'uu YKN daa'ima dawuu keessan irraa kan	1. Eeyyee 2. Lakki…..gaaffii 206ti darbi	

	ka’e isin muudatee beekaa?	99. Hin yaadadhu…G 206ti darbi	
205	Ulfa keessan kan amma irratti rakkinni fayyaa ulfaa’uu keessan irraa kan ka’e isin muudateera?	1. Eyyee 2. Lakki…gaaffii 208ti darbi 99. Hin yaadadhu…G208ti darbi	
206	Rakkowwan fayyaa ulfa’uu keessan irraa kan ka’e yeeroo ulfa alanaa isin muudate maali maali? (Deebii heddu kennuun ni danda’ama; Kan bira jechuun qoroqori.)	1. Dhiigni qaama hormaata keessaa jiguu 2. Fulli, qubinii fi milli dhiitawuu 3. Bowwoo mataa hamaa hamaa 4. Ijaan hubachuu dadhabuu 5. Hoo’inni qaama dabaluu 6. Hanqina hafuura baafachuu cimaa 7. Daa’imin socho’uu dhiisuu 77. Kan bira (ibsi) _____	
207	Erga ulfoofitan ammam ta’e?	Torban_____	
208	Yeeroo hordoffii qorumsa da’umsa duraa isa jalqabaaf gara mana yaala deemitan, ulfi keessan hangam ta’e jira?	Torban_____	
209	Waluumaagalatti kan hari’a dabalatee yeeroo meeqaaf hordoffii qorumsa da’umsa duraa taasifitani?	_____	

III. Ilaalcha dubartoonni rakko sababa ulfa’uun uumamamuu danda’aniif qabanii

Lakk	Gaafilee fi Calaltuu	Filannoo Deebii	Koodii
301	Ulfa keessan amma irratti rakkoon cimaan na muudachuu danda’a jettanii yaaddu?	1. Eeyyee 2. Lakki 99. Hinbeeku	
302	Dubartiin ulfa mara rakkoo cimaan	1. Sirrittan itti amana	

	muudatamuuf carra qabdi yaada jedhu irratti yaada maali qabdu? (Filannoo deebi dubbisiif.)	2. Ittin amana 3. Yaada hinqabu/ hinbeeku 4. Itti hin amanu 5. Sirrittan morma	
303	Dubartoonni ulfaa ogeessi fayyaa ulfi isaanii haali gaarri irra jiraachu hubatan rakko tokko malee manatti dawuu ni danda'u yaada jedhu irratti yaada maalii qabdu? (Filannoo deebi dubbisiif.)	1. Sirrittan itti amana 2. Ittin amana 3. Yaada hinqabu/ hinbeeku 4. Itti hin amanu 5. Sirrittan morma	
304	Manatti dawuun dubartii ulfaa rakkoo cimaaf saaxilu danda'a yaada jedhu irratti yaada maali qabdu? (Filannoo deebi dubbisiif.)	1. Sirrittan itti amana 2. Ittin amana 3. Yaada hinqabu/ hinbeeku 4. Itti hin amanu 5. Sirrittan morma	

IV. Waliqunnamtii maamilaa fi ogeessaa

Lakk.	Gaafilee fi Calaltuu	Filannoo Deebii	Koodii
401	Ogeessi fayyaa isin tajaajile kabaja ga'a isiniif kenne (kennitte) jettani yaadu?	1. Eeyye 2. Lakki	
402	Yeeroo ogeessa tajaajila qorumsa da'umsa duraa kennu wajjin mariyyatan, namin biro marii keessani ni dhagaya ture?	1. Eeyye 2. Lakki 99. Hinbeeku	
403	Yeeroo ogeessa fayyatiin ilaalamitanii fi wajjin mariyyatan namin biro na arge jettanii yaaddu?	1. Eeyyee 2. Lakki 99. Hinbeeku	
404	Ogeessa tajaajila qorumsa da'umsa duraa isiniif kenne gaafii gaafattanii jirtu?	1. Eeyyee 2. Lakki	

		99. Hin yaadadhu	
405	Ogeessichi gaafi akka gaafattan carra isiniif kenne ture?	1. Eeyyee 2. Lakki 99. Hin yaadadhu	
406	Yeeroon ogeessa wajjin mariin dabarsitani akkamitti ibsitu? (Filannoo deebi dubbisiif.)	1. Ga'aa ture 2. Giddugalessa 3. Bayyee gabaabaadha 99. Hinbeeku	

V. Odeeffannoo Kennuu Ilaalchise

Lakk.	Gaafilee fi Calaltu	Filannoo Deebii	Koodii
501	Odeeffannoo fi barumsa fayyaa ogeessa qorumsa da'umsa duraa isiiniif taasiise irra argatan jirtu?	1. Eeyyee 2. Lakk……gaaffi 505ti darbi 99. Hinyaadadhu...gaafii 505ti darbi	
502	Waa'ee maali maalii irratti odeeffannoo fi barumsi isiniif kenname? (Deebii heddu kennuun ni danda'ama; Kan bira jechuun qoroqori.)	1. Soorata irratti 2. Mallatto yeeroo ulfaa, da'umsaa fi da'umsa boodaa balaa agarsiisan irratti 3. Ittisa 'HIV' hadha irra gara daa'ima darbuu irratti 4. Qophii balaa ulfa'uun waliqabatee uumamu danda'uuf taasifamu qabu irratti 5. Bakka da'umsa karoorfachuu YKN faayida mana yaalaatti dawuu irratti 6. Karoora maatii irratti 7. Kununsa dhalattuu fi da'imaaf godhamu qabu irratti 8. Ittisa busaa irratti 77.Kan bira	

		(ibsi)_____ 99. Hin yaadadhu	
503	Mallattoon dubartii ulfaa irratti yoo muli'ate balaa agarsiisan maali maali? (Deebi heddu kennuun ni danda'ama; Kan bira jechuun qoroqori.)	1. Dhiigni qaama hormaata keessaa jiguu 2. Hoo'inni qaama dabaluu 3. Fulli, qubni fi milli dhiitwauu 4. Bowwoo hamaa 5. Ijaan hubachuu dadhabuu 6. Ulfi socho'uu dhiisuu 7. Hanqina hafuura baafachuu cima 8. Gaggabdoo 9. Bishaan bubbee ciniinsuun otoo hin eegaliin jiguu 77. Kan bira (ibsi)_____	
504	Mallattoon yeeroo ciniinsuu/ da'umsa yoo muli'ate balaa agarsiisan maali maali? (Deebi heddu kennuun ni danda'ama; Kan bira jechuun qoroqori.)	1. Dhhigni qaama hormaata keessa jiguu 2. Ciniinsuun irra turu 3. Gaggabdoo 77.Kan bira (ibsi)_____	
505	Mallattoon dubartii deessuu irratti yoo muli'ate balaa agarsiisan maali maali? (Deebi heddu kennuun ni danda'ama; Kan bira jechuun qoroqori.)	1. Dhiigni qaama hormaata keessaa garmale jiguu 2. Hobbatiin otoo hinbayiin turuu 3. Hoo'inni qaama dabaluu 4. Dhangala'aan ajawu qaama hormaata keessa yaa'uu 5. Gaggabdoo 77. Kan bira (ibsi)_____	

Table 5: Weekly average ANC client loads and number of respondents in the selected health facilities, Wolisso, May 2011

S.N	Name of selected health facility	Average weekly ANC client load	# of respondents calculated to be included in the study	Remark
1	St. Luke hospital	20	151	
2	Wolisso health center	20	151	
3	Korke health center	10	76	
4	Dilalla health center	6	36	
5	Hobi health center	1.5	0	Not included
Total			424	

Declaration

I, the undersigned declare that this thesis is my original work in partial fulfillment of the requirement for the degree of Master of Public Health. I also declare that it has never been presented in this or any other university and that all resources and materials used in the thesis have been duly acknowledged.

Name of student: Legesse Hirpa

Signature: _____

Place of submission: _____

Date of submission: _____

This thesis has been submitted with my approval as a university advisor.

Advisor Name: _____

Signature: _____

Date of submission: _____